

# IDAHO

## DEPARTMENT OF FISH AND GAME

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OXBOW HATCHERY

Annual Report



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by

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## OXBOW HATCHERY

### ABSTRACT

A total of 205 adult steelhead were trapped at Hells Canyon Dam this season. No chinook salmon were trapped. Prespawning mortality for 3.4% of the fish. Sixty-eight female steelhead were spawned, which yielded 294,226 green eggs. Eye-up was 88.3%.

This season was the first time that kokanee were reared at this station and 220,446 Granite Creek-strain kokanee were produced. These fish were released in Lake Pend Oreille. Adverse environmental conditions and bacterial gill disease caused severe mortalities in these fish.

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## OBJECTIVES

The objectives of Oxbow Hatchery are to:

1. Trap all steelhead and chinook salmon that return to Hells Canyon Dam.
2. Hold adult salmon and steelhead until sexual maturity in the Oxbow ponds.
3. Spawn adult salmon and steelhead and incubate eggs to the eyed stage of development.
4. Transfer eyed steelhead and salmon eggs to Niagara Springs or Rapid River Hatcheries.
5. Release available steelhead and salmon smolts into the Snake River below Hells Canyon Dam.

## INTRODUCTION

Oxbow Hatchery is located on the Snake River's Hells Canyon Reservoir at Oxbow, Oregon and is owned and financed by Idaho Power Company. The hatchery facilities are one-half mile downstream from Idaho Power Company's Oxbow Power Plant and the fish trap is located on the Oregon side of the Snake River adjacent to the tailrace of Hells Canyon Dam, 23 miles downstream from Oxbow.

Water is supplied to the hatchery by four electric pumps which draw from Hells Canyon Reservoir. Two 480-volt pumps supply 7,850 gallons-per-minute to the raceways and holding ponds. Two smaller pumps supply 200 gallons-per-minute to the incubation system. Only one pump of each size is used for normal operation. The other two pumps, which are energized by a separate power source, are utilized for emergency or auxiliary operation.

The fish-holding facilities consist of four interconnected ponds with automatic crowders, fish loading and unloading equipment and adjacent fish-sorting tanks. The four ponds can be separated by fish racks for individual use, or left interconnected for joint operation. Two ponds are 34x54x8 feet and the other two are 34x104x8 feet. The water depth is normally 4.5 feet. The ponds can safely hold about 4,000 adult steelhead.

The incubation system consist of a surge tank and two banks of distribution pipes, which space for forty stacks of incubators. There are currently twelve 16-tray Heath incubators available for rearing about 3,000,000 eggs.

Oxbow Hatchery also has six 100x6x3 feet raceways and a 360 foot incubation channel. The incubation channel is no longer operational.

Buildings consist of a mobile home residence and a hatchery building. The hatchery building is 30x62 feet. It houses an incubator room, a two-man crew room, office and a small shop.

Oxbow Hatchery is normally operated over a ten-month period between September and June. Fish trapping at Hells Canyon covers the same period. About 60% of the steelhead are trapped in the fall and 40% are trapped in the spring. The trap is removed in midwinter and mid-summer when water temperatures prevent migration and must also be removed whenever high water flows cause spilling at Hells Canyon Dam since water turbulence can damage the trap. Fish trapped at Hells Canyon are transported to Oxbow by Idaho Power Company personnel.

Steelhead spawntaking operations normally start during the first week of April and are completed by the first week of June. Eyed steel head eggs are transported to Niagara Springs where they are hatched and reared. The steelhead smolts are then returned to Hells Canyon for release.

#### FISH PRODUCTION

1982 was the first time in about 15 years that salmonids were reared at Oxbow. It is also the first time that kokanee were reared at this station.

A total of 1,494,080 surplus eyed kokanee eggs were received from Clark Fork Hatchery on January 7, 1982. These eggs were from the Granite Creek run of late spawning kokanee from Pend Oreille Lake. The hatching percentage was 82.75% and total production was 358 pounds or 220,446 fish at 615 fish per pound. Rearing losses were 84.6% (see Fish Health). These kokanee were released in Pend Oreille Lake on June 24, 1982.

#### FISH HEALTH

Adult steelhead mortalities were much fewer than during the past two years;. A total of 37 fish (23 males and 14 females) died this season for 18% of the total run. The prespawning mortality was 7 fish (1 male and 6 females) for 3.4% of the total run (Graham 1980 and 1981). Most mortalities were associated with injuries received from trapping and sorting operations. Fungus, which was a problem in previous years, was observed in only a few fish late in the spawning season. Fungus was controlled by 1 hour malachite green flush treatments administered into the holding ponds at 1 ppm on a weekly basis early in the season and three times a week during spawning season. No other disease problems affected steelhead health.

Viral analysis of ovarian fluids taken from female steelhead during spawning showed about a 30% incidence of IPN this season. No incidence of IHN was found. Samples were analyzed by Dr. Warren Groberg, a virologist for Oregon State University.

Losses of kokanee reared at Oxbow were catastrophic, with only 14.74% of the fish surviving until they were planted. I feel that the high mortality was triggered by adverse environmental conditions (high water temperatures, high siltation and nitrogen supersaturation) and a severe outbreak of bacterial gill disease.

Poor environmental conditions plagued the project from the start. A few eggs were frozen in transit to Oxbow during subzero weather in January. Egg losses were only 5.1%, however. Water temperatures varied during rearing between 1.7°C (35°F) in January to 18.3°C (65°F) in June. Calhoun (1966) states that kokanee prefer water temperatures near 50°F and temperatures above 60°F can cause severe mortality. In addition, high water flows through the Hells Canyon complex caused spilling over all three dams for about 120 days. The highest flow was on February 22nd when 88,000 cfs was measured at Oxbow. Both heavy siltation and nitrogen supersaturation caused problems during these high water conditions. Losses from nitrogen supersaturation were about 1 to 2%. Siltation in the incubators caused about a 12% hatching loss. In addition, siltation in the raceways made it impossible to see how the kokanee fry were feeding. I feel that prolonged exposure to siltation (107 days) triggered the subsequent outbreak of bacterial gill disease.

On May 20th, a sudden increase in the daily mortality prompted a fish disease investigation. Harold Ramsey at the Hagerman Fish Disease Lab determined that a severe infestation of bacterial gill disease was present in the fish. Progressive flush treatments of potassium permanganate (KMnO<sub>4</sub>) were started immediately. KMnO<sub>4</sub> at 1 ppm was increased to 4 ppm over four days. Subsequent treatments of KMnO<sub>4</sub> were administered at 4 ppm whenever mortalities increased. Although the potassium treatments arrested the outbreaks, I feel that the high water temperatures (above 58°F) and constant silt irritation prevented the fish from recovering fully.

#### FISH TRANSFERS

There were no fish transfers to other stations this year.

#### FISH TRAPPING

There were 205 adult steelhead (116 males and 89 females) trapped at Hells Canyon Dam and transported to Oxbow by Idaho Power Company.

Of these, 98.5% were Group A steelhead and only 1.5% (3 fish) were

Group B steelhead. These fish averaged 23.6 inches (67.5 cm) in length. No chinook salmon adults or jacks were trapped.

The Hells Canyon fish trap was in operation 135 days this season (Table 1). This was 55 days less than the 1980-81 fish year and 80 days less than the 1979-80 season (Graham 1980, 1981). The spring trapping season was eliminated by high water flows which prevented the installation of the trap. The trap was operated again briefly during June to count chinook jacks. No jacks were trapped and the trap was removed because spilling resumed. Normally, there would have been about 1/3 more steel head trapped, if the trap was working in the spring. I estimate that the total run of steelhead to Hells Canyon Dam to be at 600 fish.

#### FISH RELEASES

In March, Niagara Springs Hatchery released 354,680 (79,500 pounds) steelhead smolts in Hells Canyon. The fish moved rapidly downstream with the high water and few, if any, fish remained in the area by the end of May. On June 22, Hagerman National Hatchery released 70,272 (1525 pounds) fall chinook smolts at the same location. Forty surplus adult steelhead males were released in Oxbow Reservoir on May 4th.

#### SPAWNTAKING

Spawning activities started in April and were completed in May. A total of 68 females and 45 males were spawned, yielding 294,226 green eggs (1079 ounces). The eggs averaged 273 per ounce. There was an average of 4,237 eggs per female. Niagara Springs Hatchery was shipped 259,771 eyed eggs for hatching and rearing. Eye-up was 38.3%.

#### FISH FEED

A total of 2,700 pounds of fish feed was utilized (Table 2) to raise 358 pounds of kokanee, which is a conversion of 7.54:1. This poor conversion was a result of the high mortalities experienced by these fish. It cost \$1.86 per pound of fish raised.

Table 1. Summary of Hells Canyon Fish Trap operation 1981-82.

Month	Date Installed or Removed	Days in Operation	Percentage of Total Run	Chinook Trapped	Steelhead Trapped
09/81	9/14/81-in	16	3.4%	0	7
10/81	continuous operation	31	57.6%	0	118
11/81	continuous operation	30	30.2%		62
12/81	continuous operation	31	7.8%	0	16
01/82	removed 1/21/82	21	0	0	0
02/82	not operating	0	0	0	0
03/82	not operating	0	0	0	0
04/82	not operating	0	0	0	0
5/82	not operating	0	0	0	0
6/82	6/9/82-in 6/14/82-out	7 ==	1.0%	0 ==	2 ==
TOTALS		135		0	205



Table 2. Fish feed used at Oxbow Hatchery.

Feed Size		Cost Per Pound	Pounds Used	Cost
No.	1	\$ 0.2474	250	\$ 61.85
No.	2	0.2474	2,450	606.13
		=====	=====	=====
TOTAL		0.2474	2,700	667.98

#### HATCHERY IMPROVEMENTS

Several improvements were made to the holding pond area. The remainder of the wooden diffuser panels for the water inlets were replaced with steel plates. Aluminum fish racks were constructed to replace the iron pond separator racks. An all-metal shade cover was built over the spawning area where the old canvas cover was. The cat-walk to the pumps was sealed with linseed oil. Both blender pumps and the spray pumps were painted.

The hatchery building was improved by painting the shop and crew room. The old incubation water heater was removed. The fuel oil stove was cleaned and repaired.

Several improvements were made for the kokanee projects. Foam rubber strips were fastened to the covers of the incubator trays to prevent fry from escaping. Fine screen was placed over the coarse fish screens for the raceways. The old wooden keyway slots were repaired and caulked. Several crowd racks were constructed. A temporary water line was made to supply water to the raceways during fish spawning.

A new light pickup truck and canopy was purchased for the station. Several hand tools were purchased for the shop.

#### MISCELLANEOUS ACTIVITIES

There were about 2,500 visitors to the hatchery this year. Three school tours were conducted by hatchery personnel. The crew's quarters were used for 98 man-days and the hatchery was also used as a base for the big game trend survey of Unit 22.

Hatchery personnel attended In-Service Training School, the hatchery superintendents meeting, several personnel meetings and the physical fitness training program.

One public presentation was given on the Hells Canyon steelhead and salmon program to the Halfway Sportsman Club.

#### ACKNOWLEDGEMENTS

Oxbow Hatchery was staffed by Michael A. Graham, Fish Hatchery Superintendent I and Jeanne L. Wilmarth, Laborer.

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